REMARKS

This paper is submitted in reply to the Office Action dated July 27, 2006, within the three-month period for response. Reconsideration and allowance of all pending claims are respectfully requested.

In the subject Office Action, claims 2 and 8 were objected to by the Examiner. Furthermore, claims 1, 3-4, 7-8, 10 and 12-15 were rejected under 35 U.S.C. § 101. Additionally, all pending claims were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0198867 to Lohman et al. (Lohman) in view of the article "Efficient Mid-Query Re-Optimization of Sub-Optimal Query Execution Plans" by Kabra et al. (Kabra).

Applicants respectfully traverse the Examiner's rejections to the extent that they are maintained. Applicants have amended claims 1, 7, 10, 12, 13, 15, 16 and 19-21 herein, and Applicants respectfully submit that no new matter is being added by the above amendments, as the amendments are fully supported in the specification, drawings and claims as originally filed.

Now turning to the subject Office Action, and initially to the claim objections, the Examiner will note that Applicants have deleted the claim language of canceled claim 2. In addition, Applicants assume that the Examiner's objection to claim 8 was intended to be an objection to claim 10, as it was claim 10, rather than claim 8, that depended from canceled claim 9. The Examiner will note that claim 10 has now been amended to depend from claim 7 to correct this inconsistency. Additional amendments have been made to claims 13, 15 and 16 to address minor punctuation issues that were present in these claims. In addition, claims 19-21 have been amended to recite an apparatus rather than a method, for consistency with claim 16. Claim 1 has also been amended to address an antecedent basis issue. Withdrawal of the objections to claims 2 and 8, and approval of the other claim amendments are therefore respectfully requested.

Next turning to the § 101 rejection of claims 1, 3-4, 7-8, 10 and 12-15, the Examiner asserts that these claims do not result in a physical transformation outside of a computer and are not limited to a practical application. However, the Examiner will note that each rejected claim recites, in part, the concept of executing a query plan. Applicants

earnestly submit that the execution of query plan is in fact a practical application, and thus these claims are fully compliant with § 101.

Execution of a query plan, in fact, results in the generation of a result set from a database, which is a useful, concrete and tangible result, so Applicants respectfully submit that claims 1, 3-4, 7-8, 10 and 12-15 do in fact comply with § 101. Reconsideration and withdrawal of the § 101 rejections are therefore respectfully requested.

In addition, with respect to claims 13 and 15, these claims have been amended to recite a "physical, recordable signal bearing medium." Applicants submit that these amendments address the Examiner's concerns with respect to the claiming of signals. Reconsideration and withdrawal of the § 101 rejections of these claims are therefore respectfully requested for this additional reason.

Next, turning to the art-based rejections, and more specifically to the rejection of independent claim 1, this claim generally recites a method for automatic handling of errors within a database engine. The recited method includes the steps of detecting an error while executing a query access plan, automatically rebuilding the query access plan to generate a new query access plan in response to detecting the error, and executing the new query access plan.

Claim 1 has also been amended to clarify that the error is "an execution error of the type that halts execution of the query access plan." Support for this amendment may be found, for example, at page 10, lines 4-5. It should be apparent from Applicants' disclosure that the invention is directed to addressing the types of errors that ordinarily halt the execution of a query during execution of the query, e.g., function checks and like errors that essentially prohibit continued execution of a query execution plan prior to generating a complete result set for a query.

Neither reference cited by the Examiner against claim 1, Lohman and Kabra, discloses or suggests a method of automatically handling errors of the type that halt the execution of a query access plan. It is evident from a review of Lohman, for example, that the types of "errors" mentioned in the reference are errors in an optimizer model, i.e., the mathematical algorithms used to generated costs for different query access plan

implementations. The only mentions of the term "error" in Lohman, found in the abstract, as well as in paragraphs [0013], [0016], [0035], [0064], [0065], [0071], [0076], [0089] and [0099], refer to an error in a model or an estimate, i.e., an indication that an estimate of the cost of a query access plan is incorrect. These errors, at the most, are indicative of a problem with statistics collection. The errors are neither "execution errors," nor are these errors of a type that causes execution of a query to halt. There is otherwise no disclosure or suggestion in the reference of addressing any execution-type errors that result in the execution of a query or query access plan being halted, as required by claim 1. Accordingly, Lohman fails to disclose or suggest each and every limitation of claim 1.

Kabra does not address this shortcoming of Lohman. In particular, Kabra, similar to Lohman, does not disclose or suggest handling execution errors of the type that halt the execution of a query access plan. By the Examiner's own admission, the Examiner relies on Kabra for disclosing an error that is represented by a "sub-optimal" query. (Office Action, page 7, first paragraph). Applicants can find no disclosure or suggestion in Kabra of handling errors in the nature of execution errors that cause the execution of a query or query access plan to be halted. The detection of a sub-optimal query, as occurs in Kabra, perhaps results in a query being modified or re-optimized, but the decision to perform such a modification or optimization is made by the optimizer, and is more or less a voluntary operation performed on the basis of collected performance statistics. Execution errors that halt execution of a query, on the other hand, are involuntary operations that essentially terminate a query and prohibit its continued execution. Thus, even if Kabra is combined with Lohman, the proposed combination still falls short of disclosing or suggesting the handling of execution errors of the type that halt the execution of queries or query access plans.

In addition, it should be noted that claim 1 recites automatically rebuilding a query access plan "in response to detecting the error." Applicants can find no teaching in either reference purporting to disclose or suggest specifically performing an automated rebuild of a query access plan "in response to" a detected error that halts execution of the query access plan. By the Examiner's own admission, Lohman does not disclose or suggest

automatically rebuilding a query access plan, much less doing so in response to a detected error. With respect to Kabra, irrespective of whether a "sub-optimal" query may be considered an error, the reference still does not disclose automatically rebuilding a query access plan "in response to" detecting such a condition.

In addition, as noted above, one type of error that may halt execution of a query access plan is that of a function check. In rejecting claim 3, which recites that the error is a function check, the Examiner relies on paragraph [0077] of Lohman for allegedly disclosing "implicit early out" problem that may cause an algorithm to be stopped prior to counting all rows processed by a merge-join. In the rejection, the Examiner analogizes this implicit early out problem to a function check. It is important to note, however, that the implicit early out problem relates to an error in statistics collection, and not in the actual execution of a query. Furthermore, any error in statistics collection in Lohman does not cause a query access plan to be automatically rebuilt, as required by claim 1.

As such, Applicants respectfully submit that the combination of Lohman and Kabra fails to disclose or suggest each and every feature of claim 1. Accordingly, claim 1 is non-obvious over these references, and the rejection of claim 1 should be withdrawn. Reconsideration and allowance of claim 1, and of claims 3-6 which depend therefrom, are therefore respectfully requested.

Next, with respect to each of independent claims 7, 12, 13, 15, and 16, these claims each recite in part the concept of automatically rebuilding a query access plan essentially in response to an error detected during execution of the query access plan. Moreover, each of these claims has been amended to essentially recite that the error at issue is of a type that halts execution of a query access plan. As discussed above in connection with claim 1, Lohman and Kabra do not disclosure or suggest, alone or in combination, the handling of an execution error of the type that halts execution of a query or query access plan, nor does either reference disclose or suggest the automatic rebuilding of a query access plan in response to an execution error of the type that halts execution of the query access plan. Applicants therefore respectfully submit that independent claims 7, 12, 13, 15 and 16 are non-obvious over Lohman and Kabra for the same reasons as set forth above in connection with claim 1. Reconsideration and

allowance of these claims, as well as and of claims 8, 10-11, 14 and 18-21 which depend therefrom, are therefore respectfully requested.

In addition, with respect to independent claim 12, this claim generally recites in part the detection of a second error occurring during the execution of a rebuilt query access plan, and the handling of such an error by rebuilding the query access plan to replace a first implementation method of a function with a second implementation method of the function. Applicants can find no disclosure or suggestion in either Lohman or Kabra directed to any type of multi-stage error processing method that handles subsequent errors that occur after an attempt has already been made to rectify an error in a query access plan, much less any method that handles a subsequent error in the specific manner recited in claim 12. Even assuming arguendo that the handling of errors in Lohman and Kabra is analogous to automatically rebuilding a query access plan in response to a detected error, as asserted by the Examiner, neither reference addresses any functionality for handling a subsequent error that occurs after a query access plan has been rebuilt and re-executed. Accordingly, Applicants submit that claim 12 is additionally patentable over the cited references for this additional reason.

As a final matter, Applicants traverse the Examiner's rejections of the dependent claims based upon the dependency of these claims on the aforementioned independent claims. However, a number of dependent claims recite additional features that further distinguish these claims from Lohman and Kabra. For example, claims 3 and 18 recite that the error is a function check. For this feature, the Examiner relies on paragraph [0077], and in particular the disclosure of an "implicit early out," for allegedly disclosing a function check. However, as noted above in connection with claim 1, to the extent that an implicit early out is considered an error, the error is associated with statistics collection, and is not related to an execution-type error that arises during execution of a query access plan and causes the query access plan to halt.

As another example, claims 4, 10 and 19 recite to varying extents the concept of handling another error detected while executing a query access plan that has been automatically rebuilt in response to an execution error by rebuilding the query access plan to replace a first implementation method of a function with a second implementation

method. As discussed above in connection with claim 12, neither Lohman nor Kabra discloses or suggests the handling of multiple errors, or of handling errors that occur subsequent to rebuilding a query access plan.

In summary, Applicants respectfully submit that all pending claims are novel and non-obvious over the prior art of record. Reconsideration and allowance of all pending claims are therefore respectfully requested. If the Examiner has any questions regarding the foregoing, or which might otherwise further this case onto allowance, the Examiner may contact the undersigned at (513) 241-2324. Moreover, if any other charges or credits are necessary to complete this communication, please apply them to Deposit Account 23-3000.

Respectfully submitted,

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Date

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